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**Herrmann**

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(54) **METHOD FOR PRODUCING AN  
OPTOELECTRONIC COMPONENT AND  
OPTOELECTRONIC COMPONENT  
PRODUCED IN SUCH A WAY**

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(58) **Field of Classification Search**

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(56)

**References Cited**

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**U.S. PATENT DOCUMENTS**

(\*) Notice: Subject to any disclaimer, the term of this  
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4,870,224 A 9/1989 Smith et al.  
5,706,177 A 1/1998 Nather et al.  
(Continued)

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**FOREIGN PATENT DOCUMENTS**

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DE 4446566 A1 6/1996  
DE 112005003345 T5 11/2007  
(Continued)

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(52) **U.S. Cl.**

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(57)

**ABSTRACT**

A semiconductor chip without a substrate is provided on an electrically insulating carrier. The carrier has electrically conductive contact metallizations. Furthermore, an electrically conductive carrier substrate and a covering substrate are provided. The covering substrate has electrically conductive contact structures. The carrier is attached to the carrier substrate. Subsequently, the covering substrate is attached to the semiconductor chip and/or to the carrier. The electrically conductive contact structures are connected in an electrically conductive manner to the electrically conductive contact metallizations and the electrically conductive carrier substrate.

**13 Claims, 6 Drawing Sheets**

